

REMARKS

The Applicant and Applicant's attorney thank the Examiner for granting the Applicant's request for a telephonic interview. By this amendment, claim 15 has been amended and a new claim 19, which tracks previously cancelled claim 12, has been added based on preliminary agreements reached during the interview. In addition, new claim 20, which tracks claim 13 has been added. Support for the amendment is found in the specification. No new matter has been added. Claims 13, 15, 19 and 20 are presently pending in this application. Reconsideration of this application for allowance of all pending claims are hereby respectfully requested in view of the amendments to the claims and the following remarks.

Rejection under 35 U.S.C. § 103

In the Office Action, claims 13 and 15 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Cheung et al. (U.S. Patent No. 6,178,205) in view of Hossack et al. (U.S. Patent No. 6,083,168). The Applicant respectfully traverses the rejection of claims 13 and 15.

With regard to claim 15, the Examiner is directed to Fig. 7 of the present disclosure, which shows that the pixel-by-pixel differences computed by the image difference calculating section 111 are simultaneously forwarded to or shared by two other sections. As recited in claim 15 and supported by Fig. 7, one of the two sections is the motion detecting section 112 and the other is the random noise reducing section 521.

The Applicant respectfully submits that the cited prior references, either alone or in combination, do not have the feature of two sections sharing the computed pixel-by-pixel differences computed by the image difference calculation section 111, as recited in claim 15. As the Examiner correctly pointed out, Cheung does not disclose motion estimation using a sum of absolute differences. In addition, Cheung also does not suggest motion estimation using absolute

differences. Furthermore, even if Cheung and Hossack et al. are combined, the combination does not remedy the deficiency for the following reasons.

Hossack et al. describe two different approaches to compute motion. The first approach is to compute a minimum sum of differences by finding a best match of a block. The second approach is to compute motion based on differences of pixels at the same locations. However, Hossack et al. use only the first approach of minimum sum of differences to estimate an error signal related to noise because ideally, when a best match is found, the minimum sum of difference ought to be zero and any non-zero value in this minimum sum is an indication of noise. This clearly is not what is recited in claim 15, where “a difference between pixel data of pixels of the same position” is used for both motion estimation and noise reduction, as recited in claim 15. In addition, if Hossack et al. use the differences between pixel data of pixels of the same position to estimate motion, it is impossible to use the same differences for estimating an error signal related to noise because a larger motion would correspond to a larger error signal related to noise and a smaller motion would correspond to a smaller error signal related to noise. This inference is obviously illogic. Therefore, the combination fails to teach or disclose that pixel-by-pixel absolute differences are used both by a motion estimation section for motion estimation and by a random noise reducing section for noise reduction, as recited in claim 15.

Furthermore, adjusting a parameter (alpha) that is designed to control a noise level based on a difference, as disclosed in Hossack et al., is not the same as reducing noise “using a difference of pixel data of pixels of the same position”, as recited in claim 15. During the interview, it has been preliminarily agreed that the feature “using a difference of pixel data of pixels of the same position” distinguishes the present invention from Hossack et al.

Hence, the combination of Cheung and Hossack et al. fails to remedy the deficiency mentioned above. Therefore, claim 15 is not obvious over Cheung in view of Hossack et al.

The Applicant respectfully submits that claim 15 is patentable over the cited prior art and requests that rejection of claim 15 under 35 U.S.C. §103(a) be withdrawn.

Newly added claim 19, which corresponds to previously cancelled claim 12, is also not obvious over Cheung in view of Hossack et al. First, Cheung does not disclose motion estimation using a sum of absolute differences. Second, even if combined with Hossack et al., the present invention distinguishes over the prior art in at least two aspects. First, what is computed in Hossack et al. is a conventional motion vector, instead of a motion degree, as recited in claim 19. Second, Hossack et al. estimate a motion vector based on a single pair of two successive images, instead of “based on a plurality of sums of absolute values of differences between pixel data of pixels of the same position in a plurality of pairs of successive field images or frame images”, as recited in claim 19.

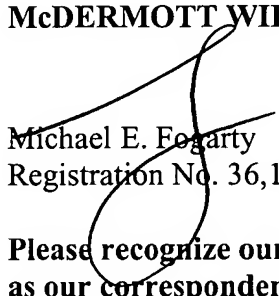
The Examiner’s attention is directed to Figure 2 of the present application, where it is clearly shown that the motion degree is estimated using K sums of absolute differences. This is compared with Fig. 4A of Hossack et al. and the equation described in Column 11, lines 8-12, where Hossack et al. explicitly disclosed that the computation of motion is performed based on only a single pair of 2 successive images. During the Interview, the Examiner agreed with these distinctions. Thus, preliminarily agreed during the same Interview, claim 19, reciting the feature of “based on a plurality of sums of absolute values of differences between pixel data of pixels of the same position in a plurality of pairs of successive field images or frame images”, distinguishes over Cheung and Hossack et al. That is, even if Cheung is combined with Hossack et al., the combination does not teach what is recited by claim 19. Therefore, claim 19 is not obvious over Cheung in view of Hossack et al. and is patentable.

Accordingly, it is believed that all pending claims are now in condition for allowance. Applicant therefore respectfully requests an early and favorable reconsideration and allowance of this application. If there are any outstanding issues which might be resolved by an interview or an Examiner's amendment, the Examiner is invited to call Applicant's representative at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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